



Where's The Launch?

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Overview

Changing Environment

Launch Vehicles

Mission Manifests

New Options

Conclusion



Changing Environment

The Launch Vehicle planning environment has changed significantly

Atlas V – 12 months standard from contract signing to launch. Advertises a 4 month capability

EELV – program calls for 24 month standard from “authority to proceed” to launch

Falcon – 8 month nominal SpaceX timeline



Changing Environment

Potential policy changes for DoD mission

Downward directed from the “top” - Dr. Ron Sega, Department of Defense executive agent for space and under secretary of the Air Force



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Launch Vehicles

Most small launch vehicles do not have a GTO capability

Leaves the larger launch vehicles

Ariane V

Atlas V

Delta II

Delta IV

Falcon 9 *

Proton *

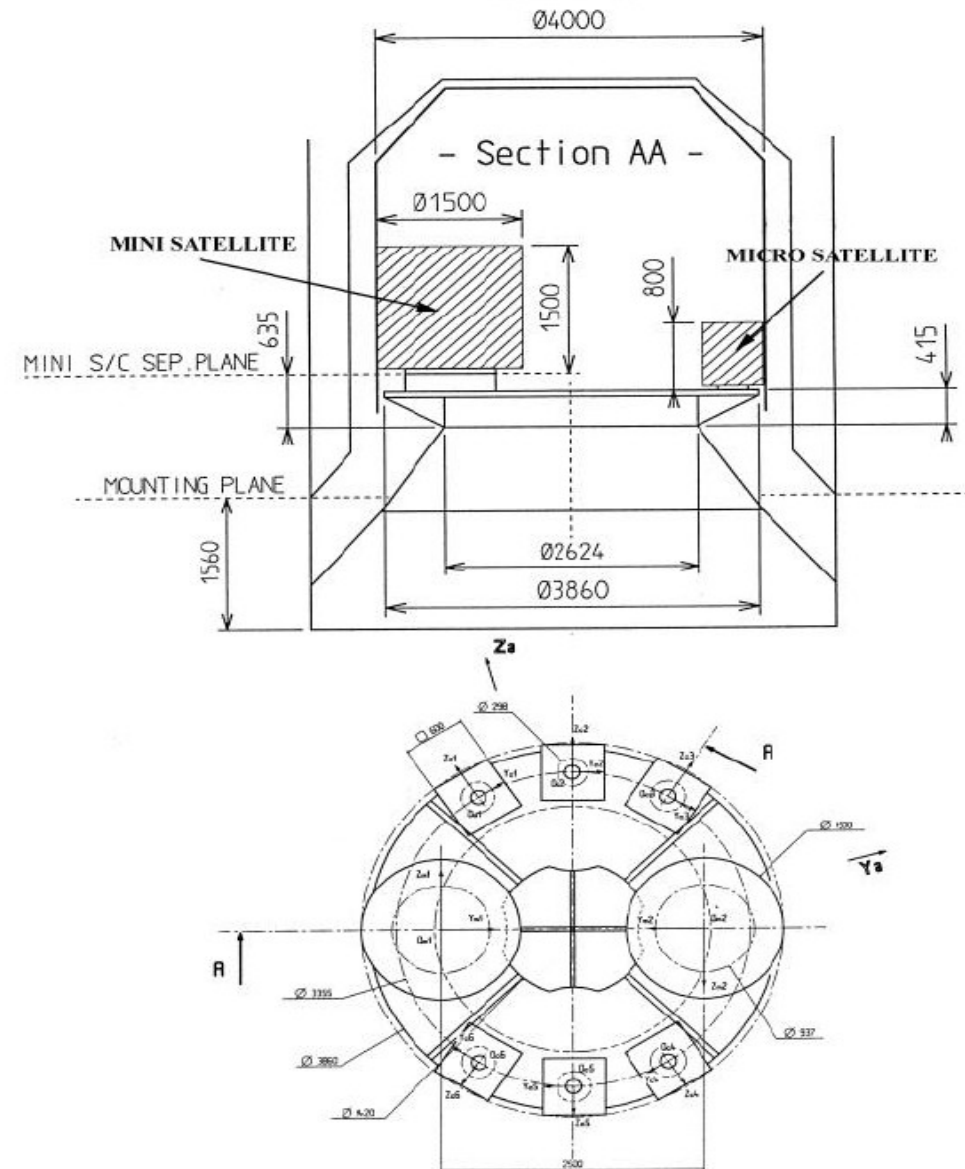
Sea Launch *

* No published secondary capability

Launch Vehicles – Ariane V

Ariane V - ASAP5

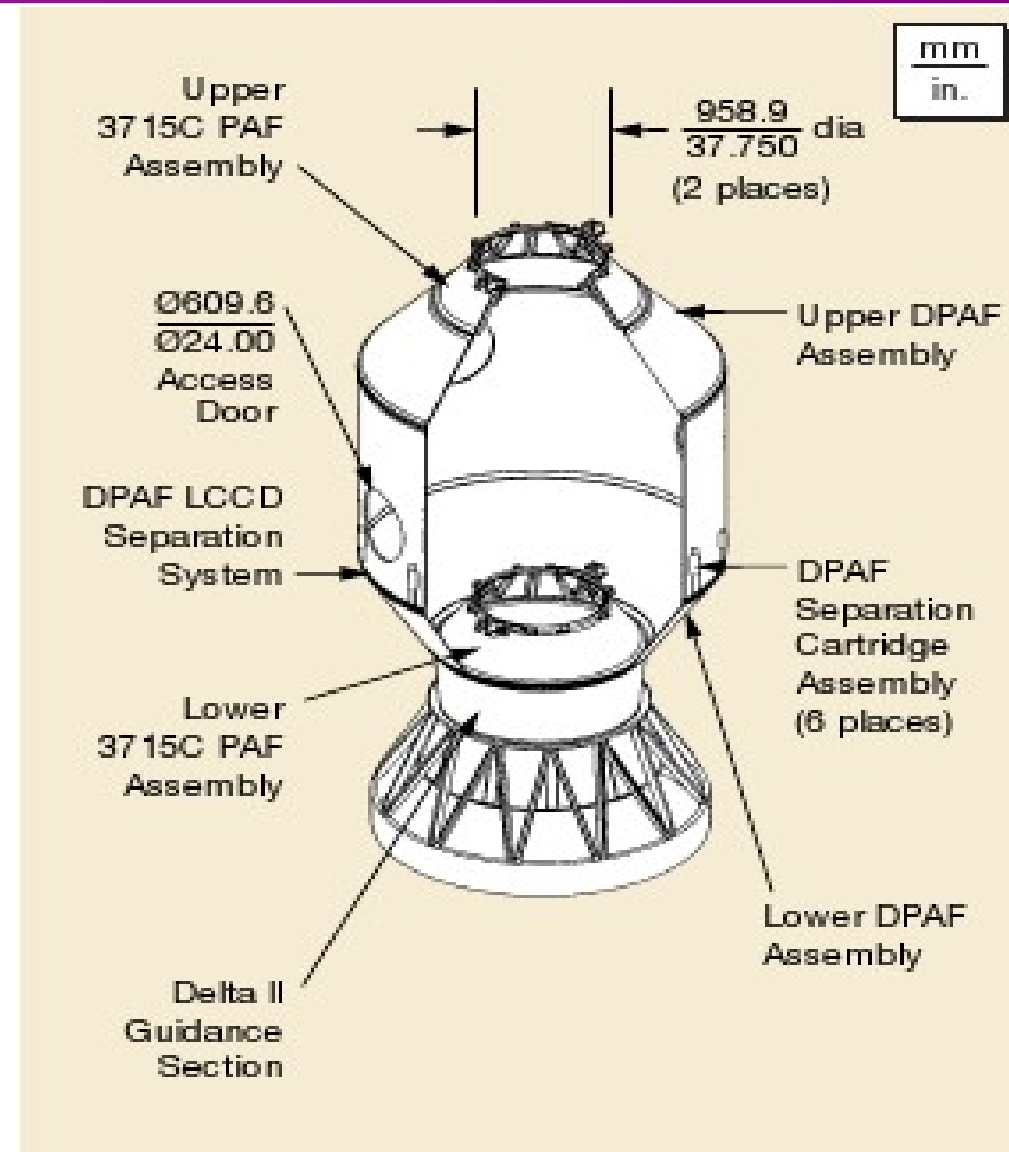
- Eagle fits
- P3E would need to have the 2m antennas stowed



Launch Vehicles - Delta II

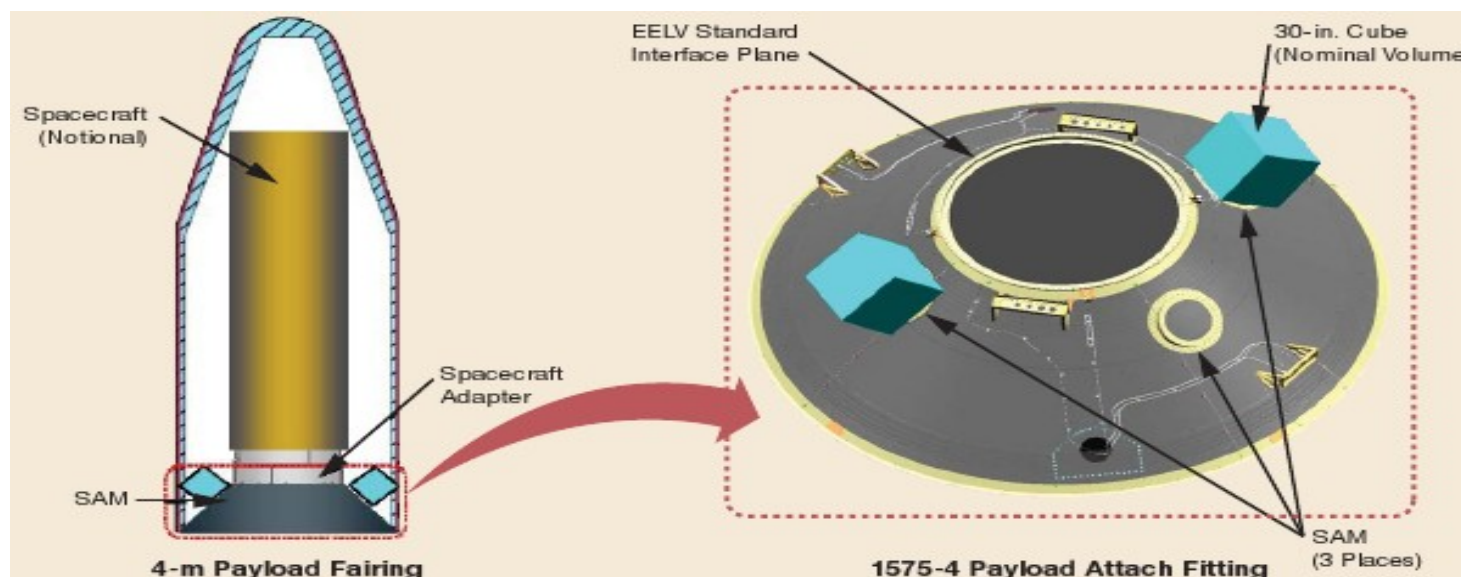
Delta II - DPAF

- Eagle fits
- P3E would need to have the 2m antennas stowed
- Looking for candidate missions



Launch Vehicles – Delta IV

Delta IV – Secondary Attach Module

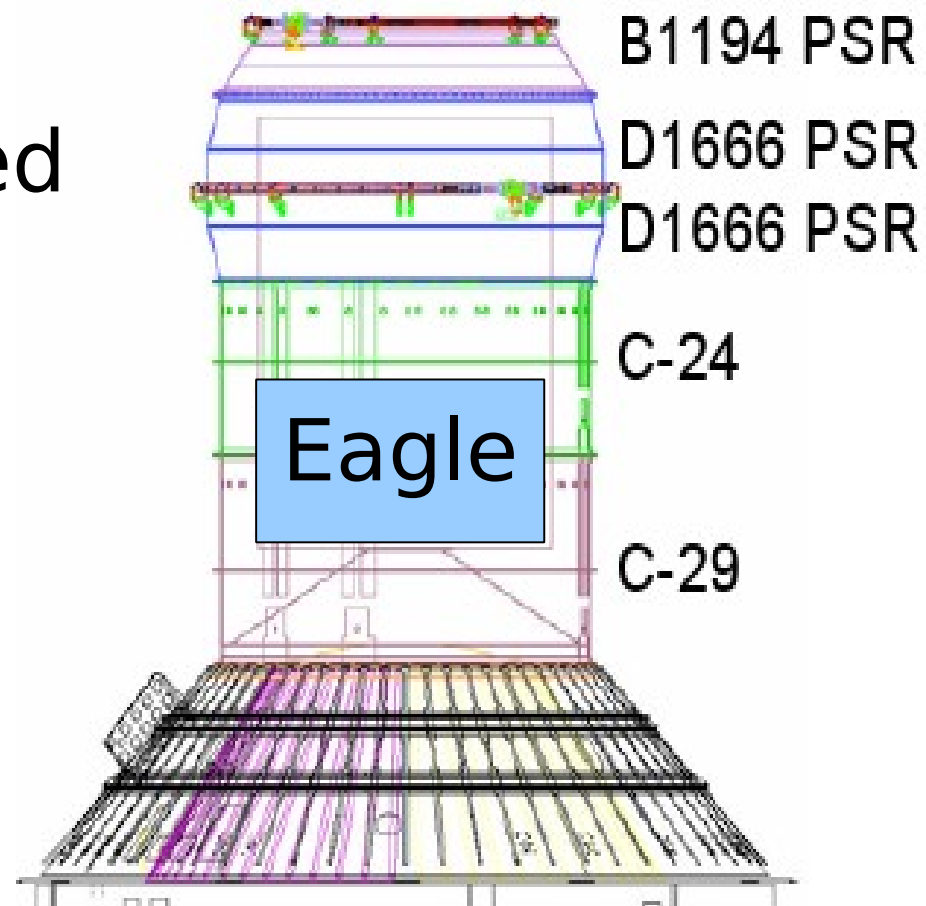


- Has not flown
- Available volume too small for Eagle or P3E

Launch Vehicles – Atlas V

Atlas V – Internal Payload Carrier

- Uses existing qualified hardware
- Has not flown
- Eagle fits
- P3E would need to have 2m antennas stowed





Mission Manifests

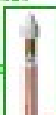
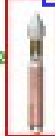
Key to secondary mission planning involves finding programs with excess capacity

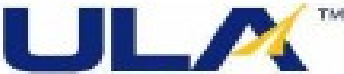
- Look for programs building constellations
- AEHF - 5 satellites
1000 lbs propellant excess
- Wideband Global Satcom - 6 satellites
1500 lbs propellant excess

Mission Manifest

Atlas V Secondary Manifest Capability



Launch Pad	CY2006						CY2007						CY2008						CY2009						CY2010						CY2011																													
	1st			2nd			1st			2nd			1st			2nd			1st			2nd			1st			2nd			1st			2nd																										
	J	M	M	J	S	N	J	M	M	J	S	N	J	M	M	J	S	N	J	M	M	J	S	N	J	M	M	J	S	N	J	M	M	J	S	N																								
CCAFS LC-41	 19 Jan Polaris AV001551									 NROL-39 AV002609			 ICD G1 AV-014 / 421			 ADEP-1 521			 QTV-1 AV012/501			 SBIRS-G-1 401			 LRO 401			 GPS IIF-3 401			 QTV-2 501			 GPS IIF-4 401			 STP-2 401			 ADEP-3 521			 GPS IIF-4 401			 GPS IIF-4 401			 STTR-1 401			 GPS IIF-4 401			 MUOS-2 501			 NROL-33 401		
	 20 Apr ASTRA-1KR AV002611						 14 Feb STP-1 AV-013 / 401			 NROL-24 421			 WGS F5 521			 WGS F1 521			 GPS IIF-2 401			 500 401			 SBIRS-G 401			 MEL 541			 GPS IIF-4 401			 ADEP-3 521			 GPS IIF-4 401			 MUOS-1 541			 GPS IIF-2 401			 NROL-38 401			 GPS IIF-4 401			 GPS IIF-4 401			 GPS IIF-4 401					
VAFB SLC-3E										 3 Apr NROL-28 AV002611			 16 Apr DMSP-13 401						 NROL-35 501						 NROL-41 501																																			



LEGEND

 Atlas V 400

 Atlas V 500

Secondary Opportunity

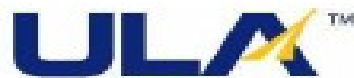
Secondary Included

*

Launch Under Review

✓

Successfully Launched



United Launch Alliance

LEGEND



Atlas V
400



Atlas V
500



Secondary Opportunity



Secondary Included



Launch Under Review



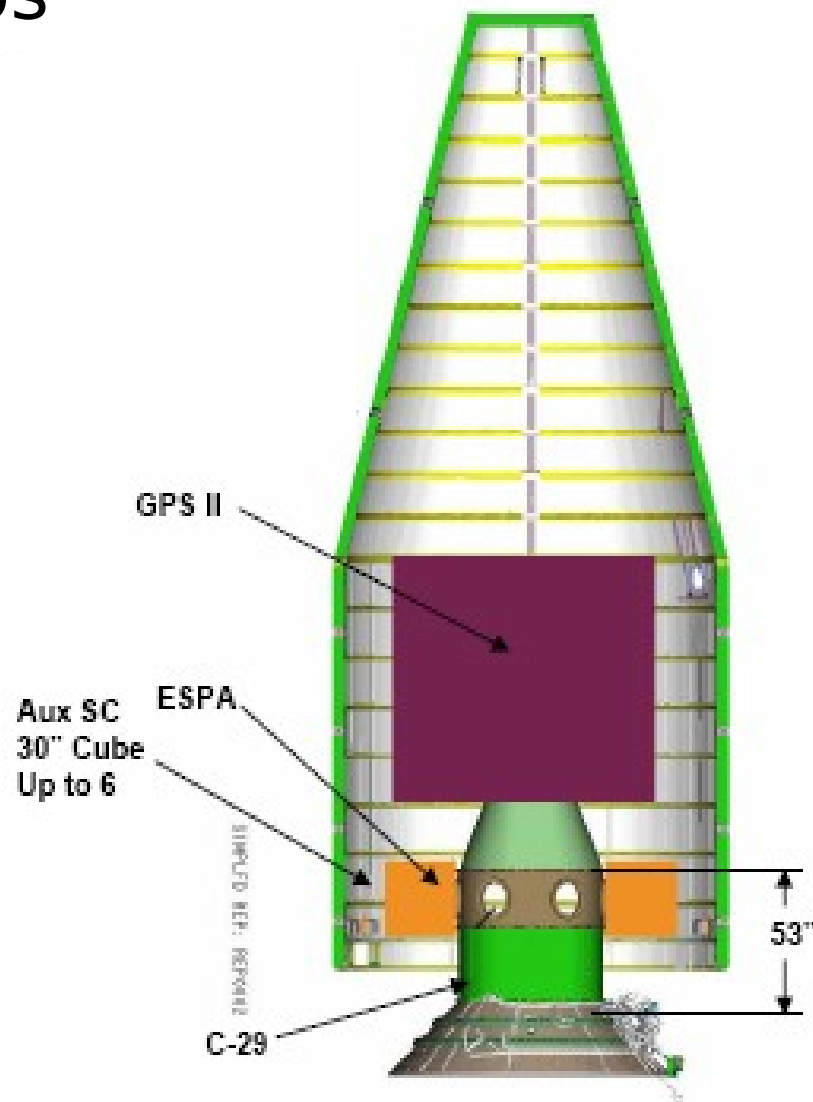
Successfully Launched



New Options – GPS IIF

Performance Margin > 1500 lbs

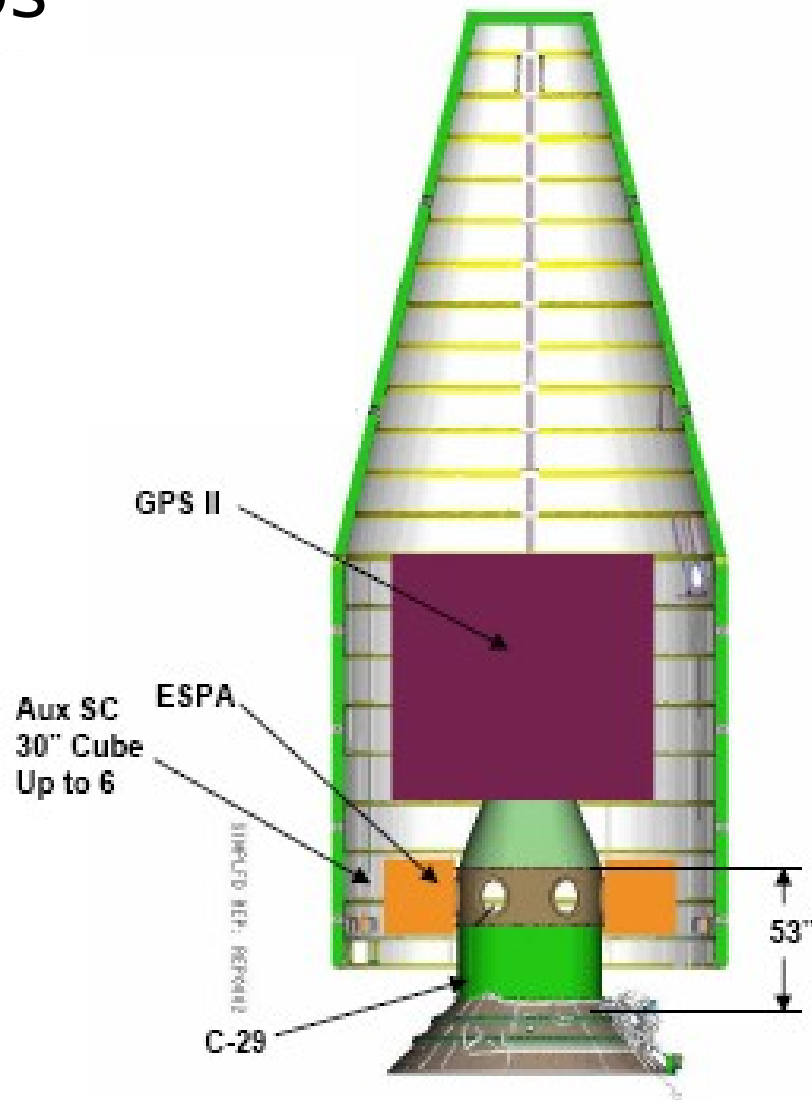
- ESPA+C29 ~ 500 lbs
- Stack shown is 53"
- Max height 106"



New Options – GPS IIF

Performance Margin > 1500 lbs

- ESPA+C29 ~ 500 lbs
- Stack shown is 53"
- Max height 106"
- GPS IIF launches to a circular GPS drift orbit
- 150 km above/below 12 hour GPS orbit
- Footprint and access durations comparable to P3

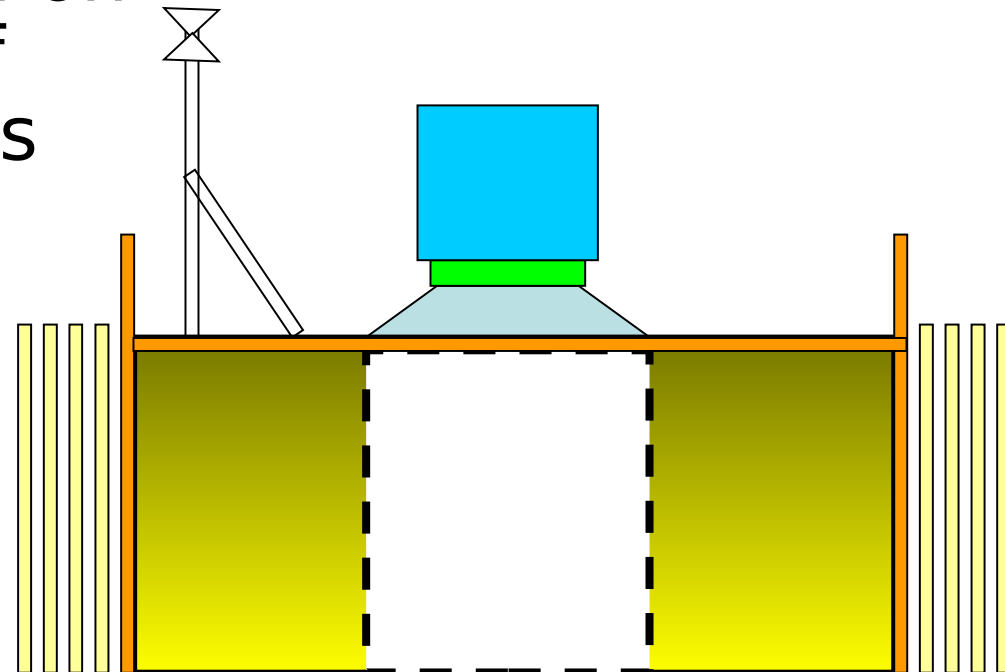




New Options - Georideshare

Satellite integrated onto the primary spacecraft

- Deploy in LEO, GTO, GEO
- Earlier deployments allow for more mass
- 2-3 flights per year
- Allows planning based on spacecraft instead of launch vehicle schedules

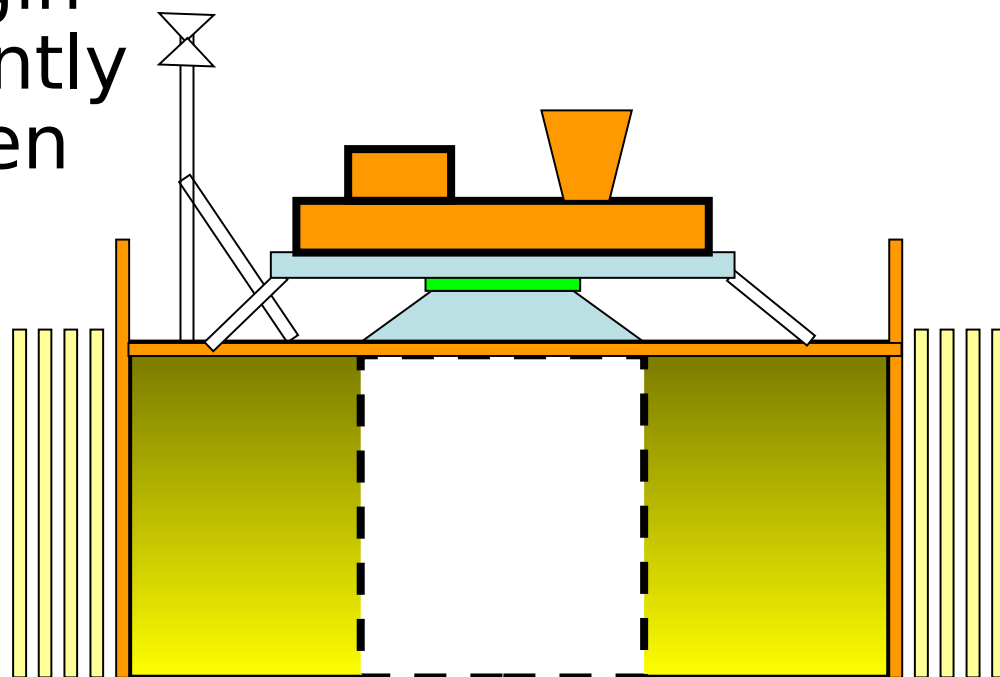




New Options - Georideshare

Payload hosted by the primary spacecraft

- Space available on the nadir pointing face
- Power, attitude control provided by host
- Proven, conservative 15 year design life
- Available power margin at end of life is significantly larger than has ever been available to an AMSAT spacecraft
- Fullfills AMSAT's vision of 24/7 HEO satellite access





Conclusion

- The environment in which AMSAT operates is constantly changing
- The emerging trends suggest a very bright future for amateur satellites



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- The environment in which AMSAT operates is constantly changing
- The emerging trends suggest a very bright future for amateur satellites
- To take advantage of these opportunities your support is needed **NOW!**